

AMENDMENTS TO THE CLAIMS

This listing replaces all prior versions and listings of claims in the application.

Listing of Claims

1. – 21. (Cancelled).

22. (Currently Amended) A method of making a nanopore array with a controlled first pattern, comprising:

providing a substrate comprising a first surface having a first pattern;

depositing a first material capable of forming nanopores onto said first surface having the first pattern; and

anodically oxidizing said first material under a first condition to form the nanopore array with the controlled first pattern in the anodically oxidized first material[[],]; and

anodically oxidizing said first material under a second condition to form a plurality of separated cells.

wherein (i) nanopores are located in the separated cells and (ii) each cell is a macropore

~~wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.~~

23. (Original) The method of claim 22, further comprising:

forming a photoresist layer on the first surface; patterning the photoresist layer to form a patterned photoresist layer; and

etching the first surface using the photoresist layer as a mask to form the first pattern in the first surface.

24. (Original) The method of claim 23, wherein the step of patterning the photoresist layer comprises holographically exposing the photoresist layer and selectively removing portions of the photoresist layer after the exposing step to form a controlled photoresist pattern.

25. (Original) The method of claim 24, wherein the step of holographically exposing comprises holographically exposing the photoresist layer a plurality of times while rotating the substrate and the exposing beam relative to each other between exposures to form a controlled three dimensional pattern in the photoresist layer.

26. (Original) The method of claim 23, wherein the first material contains first depressions which correspond to second depressions in the first pattern in the first surface of the substrate and the nanopores are selectively formed in the first depressions.

27. (Original) The method of claim 23, wherein the first material comprises an anodically anodizable metal.

28. (Original) The method of claim 22, further comprising etching the substrate using the anodically oxidized first material as a mask to form a nanopore array in the substrate and removing the anodically oxidized first material after the step of etching the substrate.

29. (Original) The method of claim 28, further comprising filling the nanopores in the substrate with a second material to form a device.

30. (Original) The method of claim 29, wherein the second material comprises a metal interconnect which contacts a solid state device on the substrate or a lower level of a solid state device metallization.

31. (Original) The method of claim 22, further comprising filling the nanopores with a second material to form a device.

32. (Original) The method of claim 22, wherein the step of filling comprises selectively filling the nanopores with a metal by electroplating.

33. (Original) The method of claim 32, further comprises selectively vapor depositing a material on the metal located in the nanopores.

34. (Cancelled)

35. (Original) The method of claim 22, further comprising:

placing a conformal template material into the nanopores, such that the template material comprises a plurality of ridges which extend into the nanopores; and
removing the template material containing the ridges from the nanopores.

36. (Original) The method of claim 22, wherein:

the step of providing a substrate comprising a first surface having a first pattern comprises forming a first photoresist pattern on the substrate; and

the step of depositing the first material comprises depositing a metal film onto the first photoresist pattern.

37. (Original) The method of claim 22, wherein the step of providing a substrate comprising a first surface having a first pattern comprises:

forming a hardmask layer over the substrate;

forming a two dimensional photoresist pattern on the hardmask layer;

forming a hardmask by etching the hardmask layer using the photoresist pattern as a mask; and

forming the first pattern by etching the substrate using the hardmask as a mask.

38. (Original) The method of claim 22, wherein the step of providing a substrate comprising a first surface having a first pattern comprises:

forming a hardmask layer over the substrate;

forming a first one dimensional photoresist pattern having grating lines extending in a first direction on the hardmask layer;

etching the hardmask layer using the first photoresist pattern as a mask;

removing the first photoresist pattern;

forming a second one dimensional photoresist pattern having grating lines extending in a second direction different from the first direction on the hardmask layer;

forming a hardmask by etching the hardmask layer using the second photoresist pattern as a mask;

removing the second photoresist pattern; and

forming the first pattern by etching the substrate using the hardmask as a mask.

39. – 41. (Canceled).

42. (Currently Amended) The method of claim 22, wherein [[a]] the first and second condition is voltage.

43. – 51. (Canceled).

52. (New) The method of claim 22, wherein the first condition is performed prior to the second condition.

53. (New) The method of claim 22, wherein the second condition is performed prior to the first condition.